

## A taxonomic review of *Stylidium* subgenus *Forsteropsis* (Stylidiaceae)

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### Abstract

Lowrie, A. and Kenneally, K.F. A taxonomic review of *Stylidium* subgenus *Forsteropsis* (Stylidiaceae). Nuytsia 11 (3): 353-364 (1997). Three new species of *Stylidium* Willd. (Stylidiaceae) from south-west Western Australia, *Stylidium leeuwinense*, *S. marradongense* and *S. semaphorum* Lowrie & Kenneally are described and illustrated. Descriptions and illustrations of *S. imbricatum* Benth. and *S. preissii* (Sond.) F. Muell. are provided for comparison and to complete this review of *Stylidium* subgenus *Forsteropsis* (Sond.) Mildbr.

### Introduction

This paper presents a taxonomic review of *Stylidium* subgenus *Forsteropsis* (Stylidiaceae) which comprises five species of triggerplant from south-western Australia including three new species described here. All members of this subgenus of *Stylidium* Willd. are characterized by being plants with tightly appressed leaves spirally arranged around the stems. They are referred to under the common names Lizard Triggerplant for *S. preissii* and Tile-leaved Triggerplant for *S. imbricatum* (Erickson 1958) as well as for the three new species.

### Taxonomy

*Stylidium* subgenus *Forsteropsis* (Sond.) Mildbr. (Mildbraed 1908: 31,33). - *Forsteropsis* Sond. (Sonder 1845: 393). Type: *Forsteropsis preissii* Sond. [= *Stylidium preissii* (Sond.) F. Muell.]

*Stylidium* ser. *Imbricatae* Benth. (Bentham 1869: 21). Type: *Stylidium imbricatum* Benth.

### Key to species of subgenus *Forsteropsis*

- 1 Flowers in umbellate racemes. Stigma round, cushion-shaped ..... **S. preissii**
- 1: Flowers in spike-like racemes. Stigma conical, capitate ..... 2
- 2 Hypanthium glabrous ..... 3
- 2: Hypanthium glandular ..... 4

- 3 Leaves with a long apical point. Sepals obovate ..... *S. imbricatum*  
 3: Leaves lacking an apical point. Sepals ovate ..... *S. leeuwinense*  
 4 Sepals ovate, apex acute. Corolla lacking throat appendages ..... *S. marradongense*  
 4: Sepals narrowly ovate with apical mucro. Corolla with throat appendages ..... *S. semaphorum*

*Stylidium imbricatum* Benth. (Bentham 1837: 73). *Type*: Interior of King George Sound, [Western Australia], *Huegel* (*holo*: K; *iso*: fragment attached to Harvey, King George Sound, MEL 710000).

*Perennial herb*, with erect divided stems covered with appressed, tile-like leaves spirally arranged around the stem. *Leaves* basifixed, green, ovate-elliptic, 1.5-1.8 mm long, 0.6-0.8 mm wide, with silvery white mucro 0.6-0.8 mm long, pilose at the base, hyaline margins silvery white, dentate-laciniate. *Racemes* terminal, spike-like; pedicels 1.5-2 mm long; bracts silvery white, *c.* 3 mm long, fringed; bracteoles similar, *c.* 2 mm long. *Hypanthium* obovoid at anthesis, *c.* 2.5 mm long, *c.* 1 mm wide, glabrous. *Sepals* free to base, obovate, *c.* 2 mm long, glabrous; hyaline margin silvery white, fringed. *Corolla* reddish violet, with laterally-paired lobes; anterior lobes *c.* 4.5 mm long, *c.* 3 mm wide; posterior lobes *c.* 4.5 mm long, *c.* 3 mm wide. *Labellum* subulate, reddish and black at the base, *c.* 2.9 mm long, *c.* 0.7 mm wide, margins bearing long hair-like stalked glands, with 2 basal acicular appendages; appendages *c.* 1.5 mm long, reddish maroon, the margins bearing a few long hair-like stalked glands; boss ovate, white, smooth, *c.* 0.7 mm long, *c.* 0.5 mm wide. *Throat appendages* 8, the 2 near the labellum *c.* 0.5 mm, the next 2 *c.* 1 mm and the 4 remaining ones *c.* 0.7 mm long. *Gynostemium* column *c.* 8 mm long; anthers black, pollen pale yellow; stigma conical, capitate. (Figure 1)

*Selected specimens examined*. WESTERN AUSTRALIA: Porongurup Range, Apr. 1939, *W.E. Blackall* (PERTH); Baby Barnett Hill, 34°24' S, 117°51' E, 20 Apr. 1980, *R.J. Cranfield* 1425 (PERTH); Stirling Range, N of Albany, May, *R. Erickson s.n.* (PERTH); Base of Mt Toolbrunup, Stirling Range, 23 Apr. 1923, *C.A. Gardner s.n.* (PERTH); Above Mondurup, Stirling Range, 4 May 1964, *C.A. Gardner* 14711 (PERTH); Foot of N side of Bluff Knoll, Stirling Range, 1 June 1958, *A.S. Georges s.n.* (PERTH); 2 miles [3.2 km] W of Karribank on Porongurups road, 28 Oct. 1966, *S.H. James s.n.* (PERTH); 2 km SE of Ellen Peak, Stirling Range, 11 May 1982, *G.J. Keighery* 4949 (PERTH); Mondorup Peak, 0.5 km up from road, Stirling Range, 34°24' S 117°49' E, 19 Apr. 1994, *K.F. Kenneally* 11443 (BRI, CB, DNA, MEL, PERTH); On South Coast Highway, 4.7 km NE of Cheynes Beach turn-off, E of Manypeaks, 2 May 1991, *A. Lowrie* 583 (PERTH); Cheyne Beach, 20 Apr. 1960, *G. Starkie s.n.* (PERTH); 6.9 miles [11 km] NNE of Cheynes Beach turn-off on Highway 1, 22 Mar. 1970, *M.D. Tindale* 315 & *B.R. Maslin* (K); Chester Pass, Stirling Range, 4 Sep. 1947, *J.H. Willis* 12 (PERTH).

*Distribution*. Stirling Range National Park, Porongurup Range and south-east to Cheynes Beach.

*Habitat*. Grows in laterite soils often mixed with a little white sand.

*Flowering period*. April-May.

*Conservation status*. Not considered to be at risk.

*Affinities*. *Stylidium imbricatum* is distinguished from all other members of subgenus *Forsteropsis* by having obovate sepals.

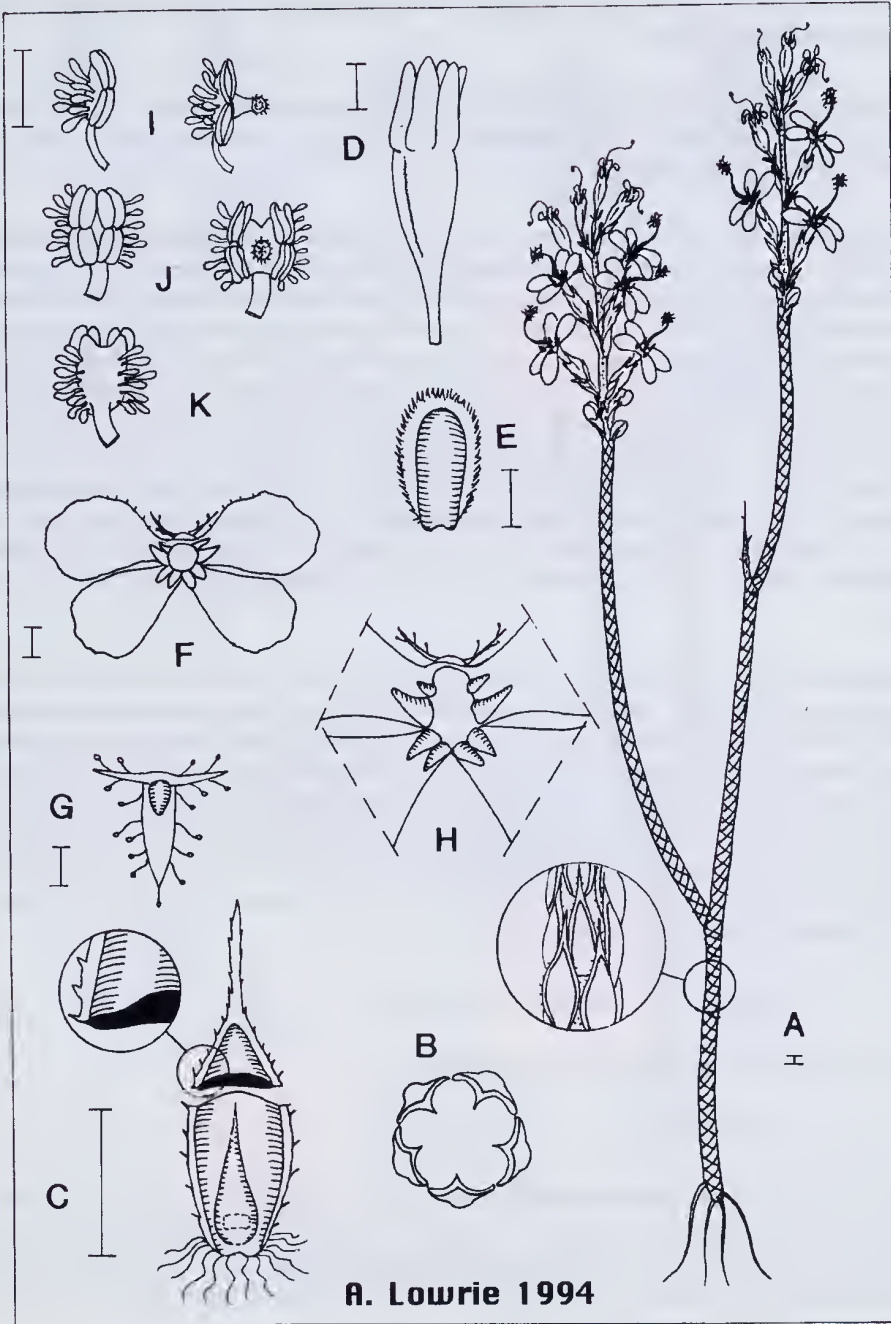


Figure 1 *Stylidium imbricatum* A - habit of flowering plant; B - section of stem showing spirally arranged leaves; C - leaf, enlarged section left; D - hypanthium; E - sepal; F - corolla; G - labellum; H - throat appendages; I - lateral view of gynostemium tip (with conical, capitate stigma at right); J - front view of gynostemium tip (with stigma grown out, right); K - back of gynostemium tip. Scale bar for all = 1 mm. Drawn from A. Lowrie 583.

***Styloidium leeuwinense* Lowrie & Kenneally, sp. nov.**

*S. imbricato* Benth. affinis sed sepalis subulatis, foliis acumene apicali absenti atque foliis quatuor circum caulem dispositis differt.

*Typus*: South corner of the intersection of Scott River Rd and Governor Broome Rd, c. 0.5 km north of Brennans Ford on the Scott River, Western Australia, 34° 17' S, 115° 25' E, 26 May 1996, A. Lowrie 1465 (*holo*: PERTH 04431170; *iso*: MEL).

*Perennial herb*, with erect divided stems covered with appressed, tile-like leaves spirally arranged around the stem. *Leaves* basifixed, green, lanceolate, 2.5-3.5 mm long, 0.5-0.8 mm wide, acute, without an apical mucro, pilose at the base, hyaline margins silvery white, dentate-laciniate. *Racemes* terminal, spike-like, flowers almost sessile; bracts silvery white, c. 3 mm long, fringed; bracteoles similar, c. 2.5 mm long. *Hypanthium* obovoid at anthesis, c. 2.5 mm long, c. 1 mm wide, glabrous. *Sepals* free to base, ovate, c. 1.5 mm long, glabrous; hyaline margin silvery white, serrate, surrounding a subulate body. *Corolla* reddish purple, with laterally-paired lobes; anterior lobes c. 4 mm long, c. 2.2 mm wide; posterior lobes c. 3 mm long, c. 1.8 mm wide. *Labellum* lanceolate, maroon, c. 3 mm long, c. 0.5 mm wide, margins bearing long white hair-like stalked reddish glands, with 2 basal acicular appendages; appendages c. 1.5 mm long, the margins bearing a few long hair-like stalked glands; boss ovate, white, smooth, c. 0.5 mm long, c. 0.3 mm wide. *Throat appendages* 8, the longest ones c. 1.5 mm long. *Gynostemium* column c. 7 mm long; anthers maroon, pollen pale yellow; stigma conical, capitate. (Figure 2)

*Other specimens examined*. WESTERN AUSTRALIA: Nut Rd and Ficifolia Rd junction, Walpole-Nornalup National Park, 3 Oct. 1988, A.R. Annels 261 (PERTH); Walpole-Nornalup National Park, 35° 14' 00" S, 116° 52' 30" E, 31 May 1989, A.R. Annels s.n. (PERTH); 200 m S of Milyeannup Coast Road, 1.7 km NE of intersection with Roberts Rd, 4 Apr. 1991, N. Gibson & M. Lyons 1118 (PERTH); Scott River sand plain, 18 Apr. 1976, S.D. Hopper 2294 (PERTH); Chester block, Augusta to Nannup, 34° 11' S, 115° 20' E, 26 May 1992, G.J. Keighery 13451 (PERTH); Quarram, 23 miles [36.8 km] W of Denmark, 31 July 1953, R. Melville 4461 & R.D. Royce (K, MEL, NSW, PERTH); Near Mt Lindsay, 1879, Muir s.n. (MEL, PERTH); Between Bow and Denmark Rivers, 20 Apr. 1960, G. Starkie s.n. (PERTH); Shannon River, 9 Apr. 1979, Survey team 1555 (PERTH).

*Distribution*. Coastal regions between Augusta and Denmark.

*Habitat*. Occurs in black sandy soil on swampy heathland.

*Flowering period*. February-May.

*Conservation status*. CALM Conservation Codes for Western Australian Flora: Priority Three. Although extending over a wide distribution, *Styloidium leeuwinense* is known from relatively few locations with small populations. The type location is situated near an active mining lease. This population could be threatened with extinction if sand mining and associated activities were undertaken at the site before a management plan for the species was in place.

*Etymology*. The epithet, *leeuwinense* refers to the Cape Leeuwin region in south-west Western Australia which is the type location for this species.

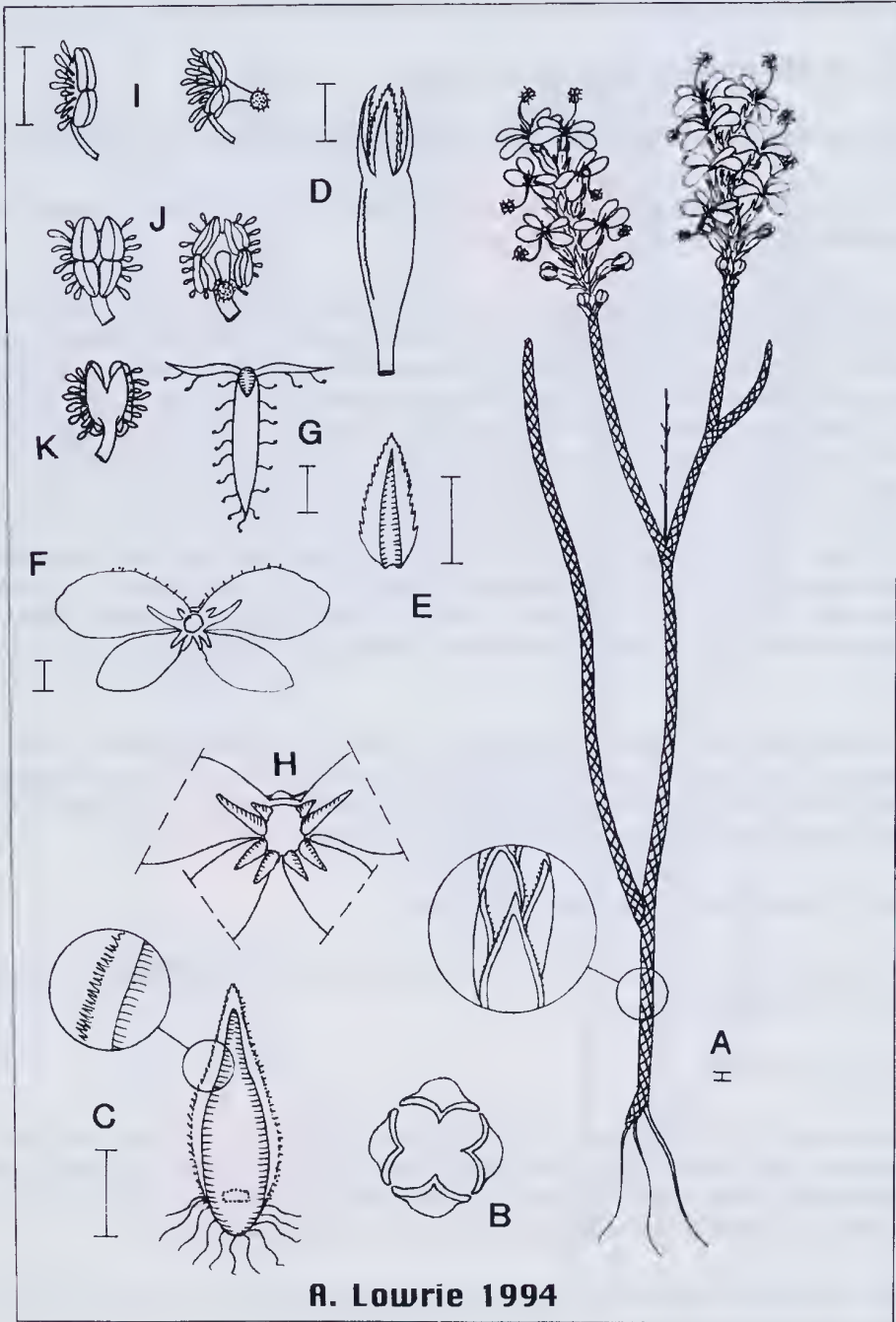


Figure 2. *Stylidium leuwinense* A - habit of flowering plant; B - section of stem showing spirally arranged leaves; C - leaf, enlarged section left; D - hypanthium; E - sepal; F - corolla; G - labellum; H - throat appendages; I - lateral view of gynostemium tip (with conical, capitate stigma at right); J - front view of gynostemium tip (with stigma grown out, right); K - back of gynostemium tip. Scale bar for all = 1 mm. Drawn from A. Lowrie 1465.

*Affinities.* *Stylidium leeuwinense* is distinguished from *S. preissii* by its spike-like racemes and from all other species in subgenus *Forsteropsis* by having leaves without an apical mucro.

***Stylidium marradongense* Lowrie & Kenneally, sp. nov.**

*S. imbricato* Benth. affinis sed sepalis ovatis, corolla appendicibus faucis absentibus differt.

*Typus:* south end of Tunnel Rd, Marradong, Western Australia, 32° 55' S, 116° 28' E, 14 October 1993, A. Lowrie 807 (*holo:* PERTH 04431189; *iso:* MEL).

*Perennial herb*, with erect divided stems covered with appressed, tile-like leaves spirally arranged around the stem. *Leaves* basifixed, green, lanceolate, 1.5-2 mm long, 0.5-0.8 mm wide, with apical silvery white mucro 0.7-1.5 mm long, pilose at the base, hyaline margins silvery white, dentate-laciniate. *Racemes* terminal, spike-like; pedicels 1-1.5 mm long; bracts silvery white, c. 3.5 mm long, fringed; bracteoles similar, c. 2.5 mm long. *Hypanthium* obovoid at anthesis, c. 3.5 mm long, c. 1.5 mm wide, glandular. *Sepals* free to base, ovate, c. 2 mm long, acute, upper half glabrous, lower half glandular; hyaline margin silvery white, fringed. *Corolla* white or various shades of pink, with laterally-paired lobes; anterior lobes c. 5 mm long, c. 3 mm wide; posterior lobes c. 5 mm long, c. 2.5 mm wide. *Labellum* ovate, white, c. 1.5 mm long, c. 0.6 mm wide, margins bearing long hair-like stalked glands, with 2 basal subulate appendages; appendages c. 0.6 mm long, glabrous; boss narrowly ovate, white, smooth, c. 0.7 mm long, c. 0.3 mm wide. *Throat* yellow, bordered by prominent reddish markings, without appendages. *Gynostemium* column c. 7.5 mm long; anthers maroon, pollen greyish white; stigma conical, capitate. (Figure 3)

*Other specimens examined.* WESTERN AUSTRALIA: Tunnel Rd, Worsley mine site, 10 km S of Boddington, 26 Sep. 1982, K.J. Atkins KA210 (PERTH); Junction of Fletcher Rd and Tunnel Rd, Boddington, 32° 37' S, 116° 29' E, 14 Oct. 1993. K.F. Kenneally 11396 (BRI, CANB, K, MEL, NSW, PERTH); Gully near Mt Saddleback, Marradong, 13 Nov. 1904, A. Morrison 14181 (K, PERTH).

*Distribution.* Occurs from Mt Saddleback to Marradong.

*Habitat.* In laterite soils in open Jarrah forest (*Eucalyptus marginata*) with *Banksia grandis*, *Dryandra sessilis* and *Persoonia longifolia*.

*Flowering period.* October.

*Conservation status.* CALM Conservation Codes for Western Australian Flora: Priority One. *Stylidium marradongense* is only known from a few locations. The small population at the type location, which is situated within an active bauxite mining lease, could be threatened with extinction if mining and related activities were commenced before a management plan for the species was in place.

*Etymology.* The epithet, *marradongense* refers to the Marradong region in south-west Western Australia where this species occurs.

*Affinities.* *Stylidium marradongense* and *S. preissii* both lack throat appendages. *S. marradongense* is distinguished from *S. preissii* by having leaves with an apical mucro, terminal spike-like racemes and conical, capitate stigmas.

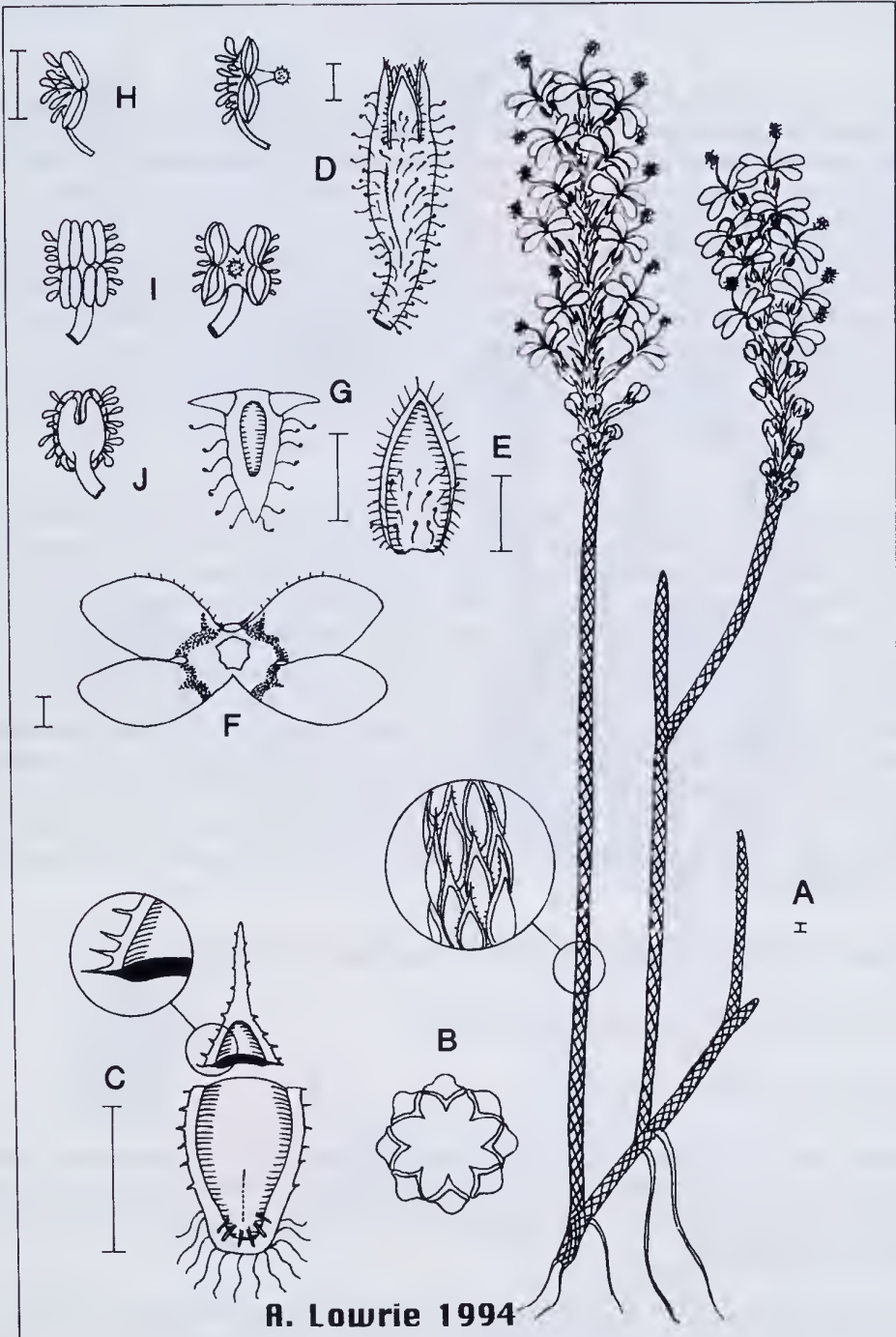


Figure 3. *Stylidium marradongense* A - habit of flowering plant; B - section of stem showing spirally arranged leaves; C - leaf, enlarged section left; D - hypanthium; E - sepal; F - corolla; G - labellum; H - lateral view of gynostemium tip (with conical, capitate stigma at right); I - front view of gynostemium tip (with stigma grown out, right); J - back of gynostemium tip. Scale bar for all = 1 mm. Drawn from A. Lowrie 807.

**Styloidium preissii** (Sond.) F. Muell. (Mueller 1863: 122). - *Forsteropsis preissii* Sond. (Sonder 1845: 383).  
*Type*: Cape Riche, [Western Australia], 22 November 1840, L. Preiss 438 (*holo*: MEL 709983; *iso*: LD, MEL).

*Perennial herb*, with short erect branching stems covered with appressed, tile-like leaves spirally arranged around the stem. *Leaves* basifixed, green, broadly trullate, *c.* 1.9 mm long, *c.* 1 mm wide, acute, with silvery white hyaline margins, fringed at base and ciliate above. *Racemes* umbellate; flowers almost sessile; bracts and bracteoles similar, silvery white, *c.* 2.4 mm long. *Hypanthium* obovoid at anthesis, *c.* 2.5 mm long, *c.* 1.2 mm wide, glabrous. *Sepals* 2 joined almost to the apex, 3 free to base, ovate, *c.* 3 mm long, glabrous; hyaline margin silvery white, serrate, surrounding a subulate body. *Corolla* white, pale or dark pink, with laterally-paired lobes; anterior lobes *c.* 6 mm long, *c.* 5 mm wide; posterior lobes *c.* 6 mm long, *c.* 3.5 mm wide. *Labellum* ovate, white, *c.* 2.5 mm long, *c.* 2.2 mm wide, margins dentate, each tooth bearing a long stalked gland; boss narrowly ovate, white, smooth, *c.* 0.9 mm long, *c.* 0.25 mm wide. *Throat* without appendages. *Gynostemium* column strap-like, hinged below the anthers, with a dilated cunabulum where the anthers or stigma rest in the set position above the sensitive torosus, *c.* 5 mm long; anthers lilac, pollen white; stigma round, cushion-shaped. (Figure 4)

*Selected specimens examined*. WESTERN AUSTRALIA: Branch Circus and Hammond Rds, Jandakot, 9 Nov. 1965, J.C. Anway 542 (MEL, NSW, PERTH); Cape Le Grande, 5 Nov. 1967, Carlquist 4013 (M, NSW, PERTH), 4031 (NSW); Beenyup Rd, *c.* 1 mile [1.6 km] S of Jandakot Siding, 27 Oct. 1963, A.S. George 5295: NE of Jerramungup, 30 Oct. 1965, A.S. George 7024 (PERTH); 29.3 km NE of Manypeaks, 9 Dec. 1986, A. Lowrie s.n. (PERTH); Turn-off to Hellfire Bay, Cape Le Grand National Park, 8 Dec. 1990, A. Lowrie s.n. (PERTH); On the corner of Stockyard Rd and Merivale Rd, E of Esperance, 28 Nov. 1993, A. Lowrie 844 (PERTH); At the junction of Hellfire Bay Rd and Lucky Bay Rd, Cape Le Grand National Park, E of Esperance, 28 Nov. 1993, A. Lowrie 847 (PERTH); On Cape Le Grand Rd, 2.4 km S of Merivale Rd, E of Esperance, 29 Nov. 1993, A. Lowrie 851 (PERTH); From the Fitzgerald Range to Cape Le Grande, 1867, Maxwells.s.n. (K); N side of Woogenellup North Rd from the junction with Chester Pass Rd, 13 Dec. 1992, F.H. & M.P. Mollemans 4393 (PERTH); Balladonia Rd, S of Mt Ragged on western boundary of Cape Arid National Park, 29 Nov. 1971, R.D. Royce 9905 (PERTH); *c.* 50 km W of Israelite Bay, E. Wittwer W1900, 17 Nov. 1976 (PERTH).

*Distribution*. Bremer Bay to Israelite Bay with disjunct populations at Jandakot.

*Habitat*. Grows in white silica sand in open heathland.

*Flowering period*. November-December.

*Conservation status*. Not considered to be at risk at locations along the south coastal region. However, the disjunct Jandakot populations (J.C. Anway 542 and A.S. George 5295) are presumed to be extinct owing to urban development. There is an urgent need of further survey to establish if other populations exist within the Perth region.

*Affinities*. *Styloidium preissii* is distinguished from all other members of subgenus *Forsteropsis* by having a strap-like gynostemium column, hinged below the anthers, with a dilated cunabulum where the anthers or cushion-shaped stigma rest in the set position above the sensitive torosus.



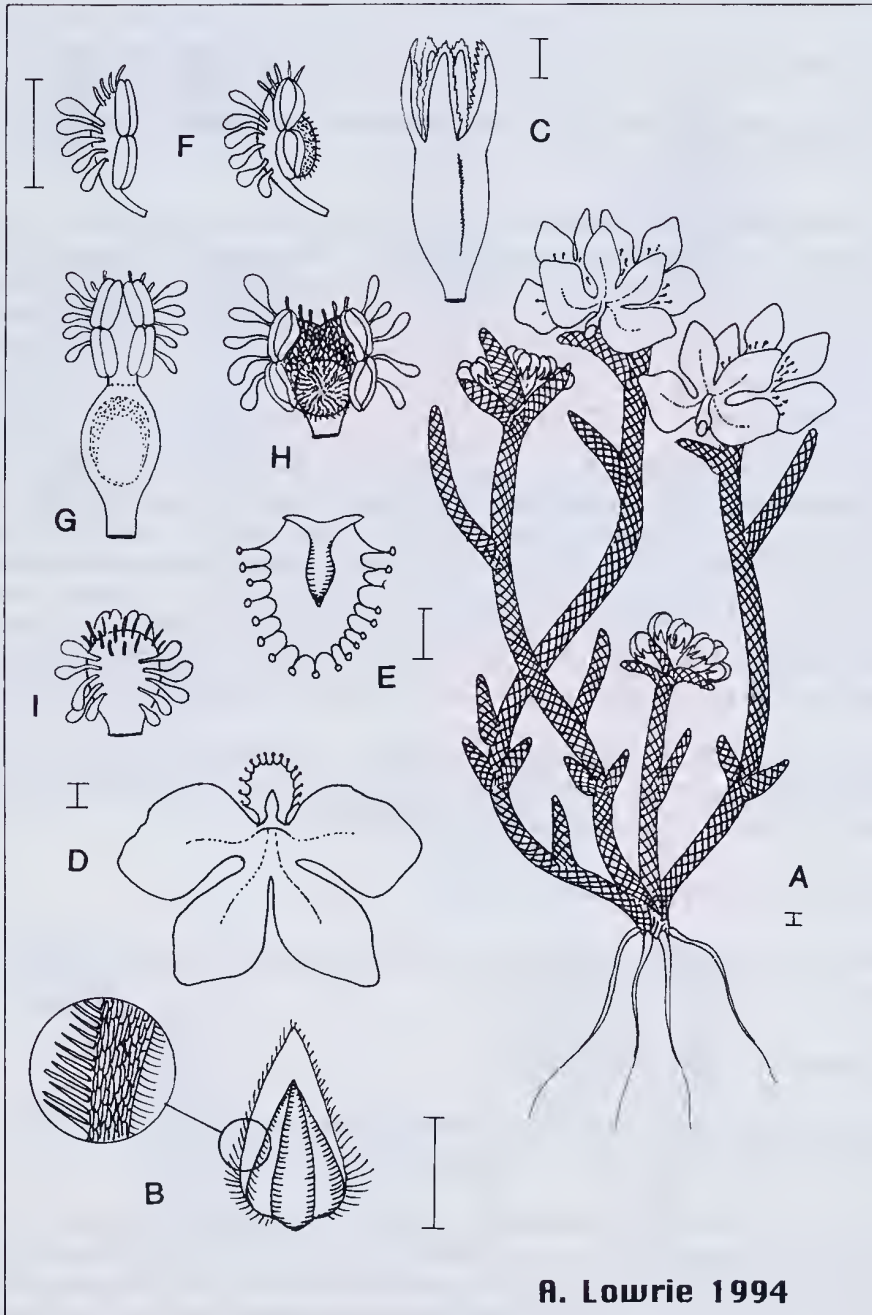


Figure 4. *Stylidium preissii* A - habit of flowering plant; B - leaf, enlarged section left; C - hypanthium; D - corolla; E - labellum; F - lateral view of gynostemium tip (with cushion-like stigma at right); G - adaxial view of gynostemium, anthers at the apex with clavate moniliform hairs along the margins, showing hinged portion (dotted) immediately below the anthers and the dilated cunabulum that the anthers fold upon when the gynostemium is in the set position; H - front view of gynostemium tip with stigma grown out; I - back of gynostemium tip. Scale bar for all = 1 mm. Drawn from A. Lowrie s.n. 9 Dec. 1986.

**Stylidium semaphorum** Lowrie & Kenneally, *sp. nov.*

*S. imbricato* Benth. affinis sed sepalis anguste ovatis et apicaliter mucronatis differt.

*Typus:* Great Northern Highway [precise locality withheld], Western Australia, 4 October 1993, *A. Lowrie* 804 (*holo:* PERTH04431197; *iso:* MEL).

*Perennial herb*, with erect divided stems covered with appressed, tile-like leaves spirally arranged around the stem. *Leaves* basifixed, green, narrowly ovate, 2-2.3 mm long, 0.5-0.7 mm wide, with silvery white apical mucro 1.2-2 mm long, pilose at the base, hyaline margins silvery white, dentate-laciniate. *Racemes* terminal, spike-like; pedicels 1.5-2.5 mm long; bracts silvery white, fringed, *c.* 2.5 mm long, with *c.* 1.5 mm long mucro; bracteoles similar, *c.* 2 mm long, with *c.* 0.7 mm long mucro. *Hypanthium* obovoid at anthesis, *c.* 2.5 mm long, *c.* 1 mm wide, glandular. *Sepals* free to base, narrowly ovate, *c.* 2.5 mm long, mostly glabrous except for the base; hyaline margin silvery white, fringed, with a short brownish apical mucro. *Corolla* pale pink, rarely white, with laterally-paired lobes, but these appearing vertically paired in relation to the plant, with the lower lobes (a combination of an anterior and posterior lobe) placed together to provide an insect pollinator's landing platform, the upper lobes spread apart in a semaphore-like arrangement; anterior lobes *c.* 5 mm long, *c.* 2.3 mm wide; posterior lobes *c.* 5 mm long, *c.* 2.3 mm wide. *Labellum* subulate, reddish, *c.* 2.5 mm long, *c.* 0.5 mm wide, margins bearing long hair-like stalked glands, with 2 basal subulate appendages; appendages *c.* 0.8 mm long, papillose; boss narrowly ovate, white, smooth, *c.* 0.9 mm long, *c.* 0.3 mm wide. *Throat appendages* 6, the 2 near the labellum pink and *c.* 0.7 mm long, the remaining 4 white and *c.* 0.4 mm long, followed by 4 dark pink throat markings. *Gynostemium* column *c.* 5 mm long; anthers dark brown, pollen white; stigma conical, capitate. (Figure 5)

*Other specimens examined.* WESTERN AUSTRALIA: Great Northern Highway, 21 Oct. 1966, *R. Erickson s.n.* (PERTH); Great Northern Highway, 31 Aug. 1991, *A. Lowrie* 298 (PERTH), 28 Sep. 1991, *A. Lowrie* 333 (PERTH), 11 Oct. 1996, *A. Lowrie* 1355 (PERTH).

*Distribution.* Known only from the type location.

*Habitat.* Grows in laterite gravel soils with *Dryandra sessilis*, on a hill summit, within a CALM Nature Reserve.

*Flowering period.* September-October.

*Conservation status.* CALM Conservation Codes for Western Australian Flora: Priority Two. *Stylidium semaphorum* is known from only one small population within a nature reserve.

*Etymology.* The specific epithet *semaphorum* is from the Greek *sema* - sign and *phoros* - bearing and alludes to the signalling method of sending messages by semaphore, whereby a person holding a flag in each hand angles the flags to code positions to relay visual messages. The upper corolla lobes of *Stylidium semaphorum* are displayed like a flag-like semaphore signalling its position to attract pollinators from their flight paths. It is interesting to note that the upper lobes of the corolla are positioned in a V-shape which is the semaphore code for "U" and "attention".

*Affinities.* *Stylidium semaphorum* is distinguished from all other members of subgenus *Forsteropsis* by having sepals with a short brownish apical mucro.

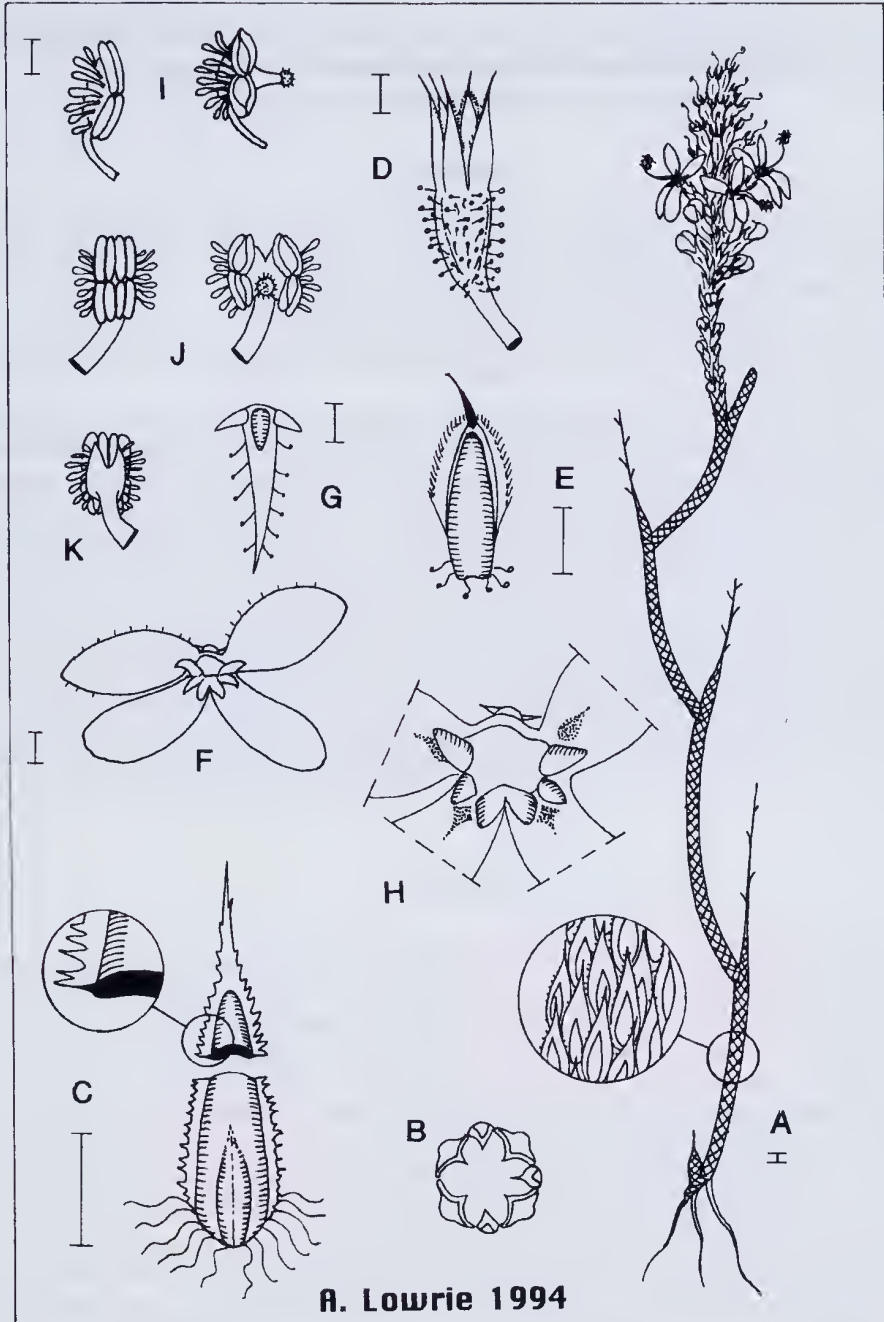


Figure 5. *Stylidium semaphorum* A - habit of flowering plant; B - section of stem showing spirally arranged leaves; C - leaf, enlarged section left; D - hypanthium; E - sepal; F - corolla; G - labellum; H - throat appendages; I - lateral view of gynostemium tip (with conical, capitate stigma at right); J - front view of gynostemium tip (with stigma grown out, right); K - back of gynostemium tip. Scale bar for all = 1 mm. Drawn from A. Lowrie 804.

### Acknowledgements

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